

1 **In the Claims**

2
3 1. (Currently Amended) A method comprising:
4 emulating an operation of a client;
5 comparing a first identifier in a pointer used by the emulated operation with
6 a second identifier included in a table entry, wherein an address to a contiguous
7 portion of emulated memory is included in both the pointer and the table entry;
8 and

9 ~~permitting the emulated operation to access a~~ accessing the contiguous
10 portion of emulated memory with the emulated operation only when the first and
11 second identifiers are the same ~~a pointer used by the emulated operation and a~~
12 ~~table entry used to manage the emulated memory both contain the same identifier,~~
13 ~~wherein an address to the contiguous portion is contained in both the pointer and~~
14 ~~the table entry and wherein the identifier is removed from the corresponding~~
15 ~~pointer to permit the access to the contiguous portion of emulated memory.~~

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17 2. (Currently Amended) The method as defined in Claim 1, wherein:
18 the table entry is in a table that includes~~contains~~ a plurality of said table
19 entries;
20 each said table entry references an address of one said contiguous portion
21 of the emulated memory;
22 the pointer is one of a plurality of said pointers; and
23 each said pointer ~~contains~~includes:
24 the address of a respective said contiguous portion of the
25 emulated memory; and

1 one said identifier corresponding to the respective said
2 contiguous portion of the emulated memory.

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4 3. (Currently Amended) The method as defined in Claim 1, wherein
5 the ~~permitted access~~ accessing further comprises ~~when the permitted access is not~~
6 ~~a read or a write operation~~, identically changing the identifier in both of the
7 corresponding pointer to contiguous portion of emulated memory and the
8 corresponding table entry when the permitted access is not a read or a write
9 operation.

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11 4. (Original) The method as defined in Claim 1, wherein the client
12 is selected from the group consisting of:

13 a personal computer (PC);
14 a workstation;
15 a server;
16 a set top box;
17 a video game console;
18 a Personal Digital Assistant (PDA);
19 a cellular telephone;
20 a handheld computing device; and
21 a computing device having less memory and/or computing resources than
22 that of another computing device executing an application that emulates the
23 operation of the client.

1 5. (Original) A computer-readable medium comprising instructions
2 that, when executed by a computer, performs the method of claim 1.

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4 6. (Currently Amended) A method comprising:
5 making a call to a memory manager for an emulated memory access
6 operation to an allocated contiguous portion of emulated memory, wherein a
7 generation count has been assigned to:

8 a plurality of table entries corresponding to a respective plurality of
9 said allocated contiguous portions of emulated memory, and

10 a plurality of pointers each ~~containing~~including an address to a
11 respective said allocated contiguous portion of emulated memory;
12 comparing the generation count:

13 in the pointer ~~containing~~including the address to the allocated
14 contiguous portion of emulated memory; and

15 in the table entry corresponding to the allocated contiguous portion
16 of emulated memory;

17 if the respective said generation counts in the comparison do not match,
18 then outputting a diagnostic; and

19 if the respective said generation counts in the comparison match, removing
20 the generation count from the pointer specified by the memory manager for the
21 emulated memory access operation during the performing of the emulated memory
22 access operation for which the memory manager was called.

1 7. (Original) The method as defined in Claim 6, further comprising:
2 performing the emulated memory access operation for which the memory
3 manager was called when there is a match of the respective said generation counts;
4 and
5 preventing the performance of the emulated memory access operation for
6 which the memory manager was called when the respective said generation counts
7 of the comparison do not match.

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9 8. (Currently Amended) The method as defined in Claim 7, further
10 comprising, when there is a match and the emulated memory access operation is
11 not a read or a write operation, incrementing the generation count in both:
12 the pointer ~~containing~~including the address to the allocated contiguous
13 portion of emulated memory; and
14 the table entry corresponding to the allocated contiguous portion of
15 emulated memory.

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17 9. (Cancelled).

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19 10. (Original) The method as defined in Claim 6, wherein the emulated
20 memory access operation is selected from the group consisting of:
21 a read operation;
22 a write operation;
23 a reallocation operation; and
24 an operation to free one or more of said allocated contiguous portions of
25 emulated memory.

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2 11. (Currently Amended) The method as defined in Claim 6, further
3 comprising, prior to the making of the call:
4 making a call to the memory manager for to allocate a contiguous portion
5 of emulated memory;
6 receiving one said pointer from the memory manager that ~~contains~~includes
7 the address of the allocated contiguous portion of emulated memory;
8 performing the allocation of the contiguous portion of emulated memory;
9 and
10 inserting the generation count:
11 in the:
12 the pointer ~~containing~~including the address to the one said
13 allocated contiguous portion of emulated memory; and
14 the plurality of table entries corresponding to the one said
15 allocated contiguous portion of emulated memory.
16

17 12. (Original) A first apparatus for emulating a second apparatus,

18 wherein:

19 the first apparatus performs the method of Claim 6, and

20 the second apparatus is selected from the group consisting of:

21 a personal computer (PC);

22 a workstation;

23 a server;

24 a set top box;

25 a video game console;

1 a PDA;
2 a cellular telephone;
3 a handheld computing device; and
4 a client having less memory and/or computing resources than that of
5 the first apparatus.

6
7 13. (Original) A computer-readable medium comprising instructions
8 that, when executed by a computer, performs the method of Claim 12.
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10 14. (Currently Amended) In a first computing device executing a first
11 application for the emulation of a second computing device executing a second
12 application, a method comprising:

13 making a call from the second application to a memory manager for an
14 emulated memory access operation to an allocated contiguous portion of emulated
15 memory used by the second application and including a plurality of said allocated
16 contiguous portions, wherein:

17 a generation count is in a plurality of table entries corresponding to a
18 respective plurality of said allocated contiguous portions of emulated
19 memory;

20 a generation count is in a plurality of pointers each
21 ~~containing~~including an address to a respective said allocated contiguous
22 portion of emulated memory;

23 for the emulated memory access operation, the memory manager
24 uses the address in the pointer that corresponds to the allocated contiguous
25

1 portion in emulated memory after removal of the generation count from the
2 pointer; and
3 prior to performing the emulated memory access operation to the allocated
4 contiguous portion of emulated memory:
5 comparing the generation count:
6 in the pointer ~~containing~~including the address of the allocated
7 contiguous portion of the emulated memory; and
8 in the table entry corresponding to the allocated contiguous
9 portion of the emulated memory;
10 outputting a diagnostic when the respective said generation counts of
11 the comparison do not match.

12
13 15. (Original) The method as defined in Claim 14, further comprising:
14 performing the emulated memory access operation for which the memory
15 manager was called when there is a match of the respective said generation counts;
16 and
17 preventing the performance of the emulated memory access operation for
18 which the memory manager was called when the respective said generation counts
19 of the comparison do not match.

20
21 16. (Currently Amended) The method as defined in Claim 15 further
22 comprising, when there is a match of the respective said generation counts and the
23 emulated memory access operation is not a read operation or a write operation,
24 incrementing the generation count in both:
25

1 the pointer ~~containing~~including the address to the allocated contiguous
2 portion of emulated memory; and

3 the table entry corresponding to the allocated contiguous portion of
4 emulated memory.

5
6 17. (Original) The method as defined in Claim 14, further comprising,
7 when:

8 the comparison finds that there is a match of the respective said generation
9 counts; and

10 the emulated memory access operation is neither a read operation nor a
11 write operation:

12 performing the emulated memory access operation for which the
13 memory manager was called and during which the generation count is
14 removed from the pointer used by the memory manager.

15
16 18. (Original) The method as defined in Claim 14, wherein the
17 emulated memory access operation is selected from the group consisting of:

18 a read operation;

19 a write operation;

20 a reallocation operation; and

21 an operation to free one or more of said allocated contiguous portions of
22 emulated memory.

1 19. (Currently Amended) The method as defined in Claim 14, further
2 comprising, prior to the making of the call by the second application to the
3 memory manager for the emulated memory access operation:

4 making a call by the second application to the memory manager for an
5 allocation of said allocated contiguous portion of emulated memory;

6 receiving one said pointer from the memory manager that ~~contains~~includes
7 an address to said allocated contiguous portion of emulated memory;

8 performing an allocation of said allocated contiguous portions of emulated
9 memory; and

10 incrementing the generation count in both:

11 the pointer ~~containing~~including the address to said allocated
12 contiguous portion of emulated memory; and

13 the table entry corresponding to said allocated contiguous
14 portion of emulated memory.

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16 20. (Original) The method as defined in Claim 14, wherein the second
17 computing device is selected from the group consisting of:

18 a PC;

19 a workstation;

20 a server;

21 a set top box;

22 a video game console;

23 a PDA;

24 a cellular telephone;

25 a handheld computing device;

1 a consumer electronic device having a processor and memory; and
2 a client having less memory and/or computing resources than that of the
3 first computing device.

4
5 21. (Original) A computer-readable medium comprising instructions
6 that, when executed by a computer, performs the method of Claim 14.

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8 22. (Currently Amended) A computer-readable medium
9 ~~containing~~including instructions for execution by a computer, wherein the
10 instructions comprise:

11 first logic calling for an emulated memory access operation with respect to
12 a first of a contiguous portion of an emulated memory for which there is:

13 a corresponding table entry in a table having a plurality of said table
14 entries that map to respective other said portions of the emulated memory,
15 wherein each said table entry ~~contains~~includes an identifier; and

16 a corresponding pointer to a plurality of pointers each
17 ~~containing~~including an identifier and an address to a respective said
18 contiguous portion of the emulated memory;

19 second logic, in response to the first logic, such that, if the identifier in the
20 table entry corresponding to the first said contiguous portion is the same as the
21 identifier in the pointer corresponding to the first said portion, then:

22 the emulated memory access operation is performed with respect to
23 the first said contiguous portion of the emulated memory; and

24 when the emulated memory access operation is neither a read
25 operation nor a write operation, the identifier is identically changed in both:

1 the table entry corresponding to the first said portion; and
2 the pointer corresponding to the first said portion;
3 third logic, when the identifier in the table entry corresponding to the first
4 said contiguous portion is different from the identifier in the pointer corresponding
5 to the first said portion, calling for a diagnostic to be output.

6
7 23. (Original) The computer-readable medium as defined in Claim 22,
8 wherein the emulated memory access operation is selected from the group
9 consisting of:

10 a read operation;
11 a write operation;
12 a reallocation operation; and
13 an operation to free one or more of said portions of the emulated memory.

14
15 24. (Original) The computer-readable medium as defined in Claim 22,
16 wherein the performance of the memory operation further comprises removing the
17 identifier from the pointer corresponding to the first said contiguous portion
18 during the performance of the memory operation.

19
20 25. (Original) A first apparatus to execute each said logic of Claim 22
21 so as to emulate a second apparatus executing an application using the emulated
22 memory, wherein the second apparatus is selected from the group consisting of:

23 a PC;
24 a workstation;
25 a server;

1 a set top box;
2 a video game console;
3 a PDA;
4 a cellular telephone;
5 a handheld computing device; and
6 a client having less memory and/or computing resources than that of the
7 first apparatus.
8

9 26. (Currently Amended) A first software program which, when
10 executed by a computing device, emulates the execution of a second software
11 program using emulated memory, the first software program comprising
12 instructions that permit the second software program to perform an emulated
13 memory access operation on a previously allocated contiguous portion of the
14 emulated memory only when a pointer and a table entry both ~~contain~~include the
15 same identifier, wherein:

16 the pointer also ~~contains~~includes an address to the previously allocated
17 contiguous portion which is useable to access the previously allocated contiguous
18 portion after removal of the identifier; and

19 the table entry maps to the previously allocated contiguous portion.
20

21 27. (Currently Amended) The first software program as defined in
22 Claim 26, wherein:

23 the table entry is one of a plurality of said table entries that map to a
24 respective plurality of said portions of the emulated memory; and

25 the pointer is one of a plurality of said pointers that each ~~contain~~include:

1 the address to a respective said contiguous portion of the emulated
2 memory; and

3 one said identifier corresponding to the respective said contiguous
4 portion of the emulated memory.

5
6 28. (Original) The first software program as defined in Claim 26,
7 wherein the performance of the emulated memory access operation on the
8 contiguous portion of the emulated memory further comprises:

9 removing the identifier from the corresponding pointer when it is processed
10 by the execution of the second software program; and

11 when the emulated memory access operation is neither a read operation not
12 a write operation, identically changing the identifier with the first software
13 program in both of the corresponding pointer and table entry after the execution of
14 the second software program has performed the emulated memory access
15 operation on the contiguous portion of the emulated memory.

16
17 29. (Original) The first software program as defined in Claim 27,
18 wherein the instructions further comprise removing the identifier from each said
19 pointer prior to its use by the second software program.

20
21 30. (Original) The first software program as defined in Claim 27,
22 wherein the instructions further comprise use of the table entries and identifiers
23 with the first software program but not by the second software program.

1 31. (Original) A first apparatus to execute the first software program as
2 defined in Claim 26, and thereby emulate a second apparatus executing the second
3 software program, wherein the second apparatus is selected from the group
4 consisting of:

5 a PC;
6 a workstation;
7 a server;
8 a set top box;
9 a video game console;
10 a PDA;
11 a cellular telephone;
12 a handheld computing device; and
13 a client having less memory and/or computing resources than that of the
14 first apparatus.

15
16 32. (Currently Amended) A computer-readable medium
17 ~~containing~~including instructions for execution by a computer, wherein the
18 instructions comprise:

19 means for emulating an operation of a client as the client executes an
20 application; and

21 means for outputting a diagnostic when:

22 the emulated operation attempts to access a previously
23 allocated contiguous portion of emulated memory using a pointer
24 ~~containing~~including an identifier, wherein the pointer is configured to
25

1 access the previously allocated contiguous portion of the emulated memory
2 upon removal of the identifier; and

3 a table entry used to manage the emulated memory does not
4 ~~contain~~include the same identifier as the identifier in the pointer, wherein
5 an address to the previously allocated contiguous portion is
6 ~~contained~~included in both the pointer and the table entry.

7
8 33. (Currently Amended) The computer-readable medium as defined in
9 Claim 32, wherein:

10 the table entry is in a table that ~~contains~~includes a plurality of said table
11 entries;

12 each said table entry references an address of one said previously allocated
13 contiguous portion of the emulated memory;

14 the pointer is one of a plurality of said pointers; and

15 each said pointer ~~contains~~includes:

16 the address to a respective said previously allocated
17 contiguous portion of the emulated memory; and

18 one said identifier corresponding to the respective said
19 previously allocated contiguous portion of the emulated memory.

20
21 34. (Original) The computer-readable medium as defined in Claim 32,
22 further comprising means for permitted the attempted access by the emulated
23 operation to the previously allocated contiguous portion of emulated memory,
24 wherein during prior to said access:
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1 the identifier is removed from the corresponding pointer to the contiguous
2 portion of emulated memory; and

3 when the permitted access is not a read or a write operation, the identifier in
4 both of the corresponding pointer to contiguous portion of emulated memory and
5 the corresponding table entry is identically changed.

6
7 35. (Currently Amended) The computer-readable medium as defined in
8 Claim 34, further comprising:

9 means, prior to an allocation of the previously allocated contiguous portion
10 of emulated memory, for making a call to a memory manager for an allocation of
11 the previously allocated contiguous portion of emulated memory;

12 means for receiving the pointer from the memory manager that
13 ~~contains~~includes the address to the previously allocated contiguous portion of
14 emulated memory;

15 means for performing the allocation of the previously allocated contiguous
16 portion of emulated memory;

17 means for inserting the generation count in the table entry; and

18 means for copying the generation count from the table entry to the pointer.

19
20 36. (Original) The computer-readable medium as defined in Claim 32,
21 wherein the client being emulated is selected from the group consisting of:

22 a PC;

23 a workstation;

24 a server;

25 a set top box;

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a video game console;
a PDA;
a cellular telephone;
a handheld computing device; and
a computing device having less memory and/or computing resources than
that of another computing device executing an application that emulates the
operation of the client.